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TO THE  
MASTER, WARDENS, AND COURT OF  
EXAMINERS OF THE  
CORPORATION OF SURGEONS  
OF LONDON,  
THE FOLLOWING  
OBSERVATIONS AND REMARKS  
RESPECTING  
THE MORE EFFECTUAL MEANS OF PRESERVATION  
OF  
WOUNDED SEAMEN AND MARINES  
ON BOARD OF  
HIS MAJESTY'S SHIPS,  
IN TIME OF ACTION,  
ARE HUMBLY SUBMITTED,  
BY THEIR MOST OBEDIENT SERVANT,  
C JAMES RYMER,  
SURGEON OF THE ROYAL NAVY.

1786



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**T**H E author of the instructions for navy surgeons has been very sensible of the principal business of these gentlemen during action. They are particularly directed, to bestow all possible attention to the wounded men, in what relates, more especially, to stop and prevent effusions of blood ; because, upon this immediately depend the lives of many brave men.

In the history of engagements by sea, we are presented with melancholy lists of the killed and wounded. Here our compassion is excited—commentation upon such sorrowful subjects seems to be precluded ; and for the most part, silence ensues. We seldom go farther ; we rarely enter into an investigation, whether those said to have been slain, were absolutely and instantly killed ; whether they died by loss of blood ; and, whether, in that case, it might not have been possible, by an immediate prevention of hæmorrhage to have saved them.

I am aware of the very great delicacy attending enquiries of this nature, howsoever necessary they may be :

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The public, in general, having read, with deep concern, the account of a sea fight relative to the killed and wounded, is willing to thank *God Almighty* that the case was not worse. They naturally, and very charitably suppose that the surgeon's conduct is irreprehensible—having exerted his utmost efforts in the performance of his duty ; and, that, of course, he is supplied amply with every instrument necessary in his profession, as well as *skilful* in such methods as are best adapted to the *circumstances* of battle. But, the same public, I apprehend, would be shocked, when told, that, in time of action, many a brave man perishes, by loss of blood, for want of proper and timely assistance.

Hence, and, in this place it may not be improper to take notice of a stigma cast upon surgeons of the navy, by a late popular man, in an august assembly. If my memory does not betray me, I think it was observed, that some surgeons in his Majesty's navy, were not worthy to be entrusted with horses or dogs. As I look upon the person who advanced this very learned and liberal assertion, to be in this instance, cruel and uncharitable, we will readily forgive the uninvestigated reverie ; and attribute the uncandid thought in the amplest manner, to a total defect of reflection upon cause and effect.

In submitting my remarks on this important subject, with all deference, on my part, to superior judgment and more enlarged understanding, I have no other view  
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But the better preservation of gallant men, who bleed for their country ! And, as every innovation upon established rules should necessarily be conducted with prudence and serious circumspection, I trust, it will appear that the sentiments contained in these pages, are not the chimerical production of a theoretical brain ; but, by candid deliberation, have arisen purely from motives of humanity as well as of evident necessity.

If it shall be judged necessary and expedient to draw any conclusion in favour of what I humbly point out ; if it shall appear, that in time of war, surgeons should be furnished, by government, with a greater number of tourniquets ; and that Petit's tourniquet, or, the one I submit to judgment, is best calculated to answer public utility, I shall be very happy. If on the reverse, it may appear both unnecessary and inexpedient, and that my tourniquet is not to be preferred to Mr. Petit's, I hope I shall not be judged to merit censure in having advanced such observations and propositions, as appeared to me to have a direct tendency to the preservation of our fellow creatures.

It is a lamentable truth, that on ship-board, in action, many men have bled to death, who might have been preserved, by proper and timely aid : and, it is to be feared, that while the present system of operating, and the surgeon's apparatus shall continue  
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without alteration, in some particulars, and addition in others, such shocking cases will occur.

In the navy, upon sight of a strange sail, it is common, in time of war, to beat to arms—all hands to quarters; the surgeon and his mates, of course, go to their station in the cock-pit, to get every thing in readiness. The instruments are, in general, confusedly at hand in a box. Then there is a display of bandages, compresses, bolsters, pledgits, splints, tow, rollers, flower, bol. armen. ol. terebinth. bals. traumatic. and other similar articles, which in my humble opinion, in a great measure, only serve to betray our weakness, and to cast a sorrowful veil over danger and death. How often have I heard of stumps and dangerous wounds having been plastered over, and bound up, when principal branches of arteries were untied, and the poor souls consequently perished by hæmorrhage!

Let me ask, first, what capital cases a surgeon has to expect in time of action: and, secondly, what instruments he will have the most occasion for. The most dangerous and alarming cases will be limbs shot off—or so injured by laceration and fracture, that they must soon be amputated. If an arm or leg is fairly shot off, there will be a hæmorrhage, a ragged stump and a shattered bone or bones; an amputation must therefore be performed to remove the injured parts. Here the instruments required are tourniquets *immediately*. The knife, the saw, the needle and ligature, may be *for a while* postponed. The circumstances of other cases,  
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of less danger, will naturally guide the surgeon in his choice of instruments and applications : But he must by no means finally dress a wound, till the divided arteries are secured by needle and ligature—external applications are not to be trusted. I never desire to see dangerous wounds or stumps bound up, till I am certain there is no danger from hæmorrhage : and then the bandage should be applied so, as just to retain the dressing—no tight compression. For, why create to one's self anxious trouble, and additional pain to the distressed ?

In all affairs of imminent danger and terrible conjuncture, the systematical rules of science must very frequently submit and give way, to inventions of necessity, and stratagems of ready judgment.

It would be very vague and inconsistent to suppose, amidst the horrors of actual war, the noise, the incessant bustle and distraction of engagement, that an amputation should be as properly, and chirurgically, performed in a cock-pit, as in a room on shore.

I humbly conceive, that if the navy were furnished with the best surgeons and ablest operators, it would be ill judged to think, with the present means, they could timely be able to extend relief to every wounded man, and discharge their duty professionally. Time, place, and the circumstances of battle, all combine against the immediate performance of capital operations, agreeably to the established rules of the chirurgic art.



It is very simple and easy, over a glass, to enumerate the steps of an operation. Some, unacquainted with the nature of a ship and sea actions, may suppose a great deal of business might be done with two tourniquets. Such might say,—I would soon apply my tourniquet, my tape, or not tape—then I would make my first incision through skin and adipose membrane—then I would save all the skin I could, by retraction—then I would divide the muscles by two circular sweeps down to the bone—then I would draw up the muscles—then I would saw the bone—then I would secure the arteries by needle and ligature—draw my skin down—apply lint, &c.

This is very innocent doctrine, and might have some application in sea practice, provided the destiny of war would always keep an eye upon the surgeon, and not shoot off a second man's leg or arm, till the first sufferer shall have been so treated as to be out of immediate danger.

In an action by sea, for instance, on board of a third rate; ten or fifteen amputations are required to be immediately performed; one of a leg; one of an arm,—the surgeon has but two of Petit's screw tourniquets—he must use these tourniquets in performing ten or more operations: By the time he has finished two patients, perhaps four or more of the others are dead. He must secure the divided arteries of each stump, by needle and ligature. He goes on slowly, and, sometimes, bunglingly. His mind is agitated, and his whole frame shakes, in a scene of distress, surpassing all description.

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But, in his favor, can it be supposed a man, even of great fortitude and dexterity, shall timely perform this business, under such circumstances, with propriety? Then, what is to be done to save these brave men? I judge, it would be insulting human nature, as well as the principles of a generous and grateful nation, to allege, that any idea of extra-expence should prevent the adoption of new and efficacious means. The answer appears to me to be simply this: Let every surgeon be supplied with a number of proper tourniquets, in proportion to the complement of the ship. I humbly think, a frigate should be allowed fifteen, if not twenty; and the surgeon might be charged with them, as he is with some other articles. Upon an average, we will suppose there are 200 ships to be supplied with tourniquets, according to this plan—that one ship with another shall have ten tourniquets—that each tourniquet, made in a masterly and workman-like manner, shall cost twenty shillings: So that here would be an expence to the kingdom of Great Britain of 2000*l.* to furnish it's Navy with tourniquets. When we consider, that, with care, these instruments shall be fit for use after a period of thirty years—that they are machines adapted to the noblest and most generous purpose humanity can possibly suggest, the preservation of brave men, who devote their lives in support of the honor and dignity of their country—so small a sum cannot be judged to be ill applied.

Here would be a new and goodly scene of relief—a certain prospect to prevent all embarrassment, as well

as complaints and reflections upon the surgeon's conduct.

In general, the courage of a thinking and judicious man, exposed to danger and difficulties, will be found to be in proportion to the absolute and attainable means of preservation and safety. In time of action, if a surgeon is conscious he has it in his power to preserve wounded men, by a simple, easy, and expeditious method, his mind will be steady and collected; and he will possess double fortitude.

In the present system of distributing tourniquets, there is surely no proportion observed between the complement of a floop and a first rate. If the first must have two, the latter should consequently have sixteen; and as the price of these, agreeably to the prevailing rules of service, would be deducted from the surgeon's emoluments, it would be more than his income could afford. By comparison, it would be highly absurd, if Captains of men of war were enjoined to furnish any article essential to his Majesty's service, from their own purse.

In time of action, if a man is brought down to the surgeon, having a limb shot off, the surgeon's conduct might be simply this: let him, or his mate, apply a tourniquet; and having made a necessary compression, and studying to save as much skin as he can, he may remove the lacerated and shattered parts by an amputation: let him apply dry lint to the stump;  
and

and keeping the tourniquet fixed, let the patient be thus removed to the plat-form, to remain till time admits of further attention. In this manner, the surgeon or his mates might proceed with others in similar situations.

As to needles and ligatures, at this period of confusion, it would require too much time; and, perhaps, the surgeon's hand might be very unfit for such a nice business.

If circumstances will not allow him to attempt to operate, he may in general preserve the life of his patient, by the application of a tourniquet:

I will give one instance, out of many, to indicate the necessity and propriety of adopting such means as I have the honor to recommend.

In a late action, which happened in America, (upon that coast) on board of one of his Majesty's ships, an officer, a friend, and formerly a mess-mate, for whose melancholy fate I mourn, had both his lower extremities shot off about the knees; and, he died presently after, in consequence of the hæmorrhage. I apprehend, if there had been spare tourniquets at hand, the life of this brave man might have been saved. Any person of common sense might have applied the machine. It is here to be understood, the surgeon was busy below, and had both his tourniquets in use.

Another

Another great reason for adopting such a method of proceeding, during action, is, that in case a surgeon, from whatsoever cause, \* shall be unable to perform his duty, such cases as require an immediate application of the tourniquet, may be assisted by any person of common steadiness; and, thus, men dangerously wounded, may be preserved, till proper help can be had.

The embarrassments arising from the motion of the ship, in case of action when it blows fresh, or when there is a great swell with little wind; also the inconvenience of candle light, too frequently rendered dim and obscure, by smoke, and the very confined place the surgeon is stationed in, claim particular attention. It will hence appear, a surgeon cannot at this time operate as he might wish.

Besides, it may be the case, some young surgeons, of little experience in capital operations, of great delicacy and sensibility of constitution, shall be so affected, so embarrassed, and in such tremor during action, as not to be capable to make use of the needle and ligature; which, in time of action is tedious and laborious; and requires, moreover, a steady hand, as well as a clear and methodical head. In such a dilemma, even a wounded man himself might save his own life, by the application of the tourniquet: at least, it will seldom happen, but some by-stander will be ready to do it for him.

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\* The surgeon of a third rate in Admiral Keppel's affair lost an arm,

I look upon proper tourniquets to be so essentially necessary in time of action, both by sea and land, that I think every officer in particular, and every sixtieth man should be possessed of one, over and above the number the surgeon may be allowed.

When a man has a limb shot off; or, receives a wound in any extremity, followed by an effusion of blood, instinct, or the common principle of self-preservation, predominating in a rational being, not only for it's individual self and fellow creatures, but the whole animal creation, will induce any by-stander immediately to apply a compression above the stump or wound. He will grasp it with his hands; he will surround it with a garter, a handkerchief, a cord, or other analogous substance in the way. But, as this simple force is insufficient, inconvenient and unsecure, mechanical power must be had recourse to; and, if this power, when applied, in time of action, shall answer, without any assistant being required, and without any manner of danger, from the ligature slackening by any chance touch applied to the lever, during the time the patient, on whose leg or arm it may be applied, shall remain on the plat-form, among other sufferers, it must be the more eligible.

The best tourniquet hitherto in use, is that of Mr. Petit. It is an excellent instrument. The grand objection to this machine, *in time of action*, is, (waving all futile considerations of impeded motion, twisting of it's parts, and previous skill in it's application)

tion\*) that when screwed up to the degree required, the smallest accidental force applied to the extremity of the lever, will unscrew it, and of course, slacken the ligature : wherefore a sentinel is always required ; otherwise the patient, who is supposed to be removed apart, may bleed to death. As this objection appears to me to be well founded, and deserving of particular consideration, if each person, who has a tourniquet applied, shall require a watchman, such tourniquets, had they all the merit of philosophical mechanism besides, are of little use *in time of action* ; because, at this conjuncture, men cannot be spared for such purposes. It is also said, it will unscrew of itself. I have known this to be the case : but here I apprehend, sufficient attention had not been bestowed upon it's formation by the workman. As to the contrivance of the conglomerated bandage and stick, it is liable to a variety of objections.

However, to obviate all objections and complaints of this nature, we have only to recur to a tourniquet, whose power is sufficient in all cases ; it's motion equable, quick, and to be regulated and remain fixed and immoveable at any degree. This we cannot obtain without a combination of the mechanical powers : and we cannot combine these powers in any machine, without an apparent inconvenience from weight and bulk ; which, in practice, will be found, I humbly conceive,

\* Some confused heads have applied it with the buckle drawn up to the machine, and have conceived the buckle cushion was meant for the base of the tourniquet to rest upon.



conceive, to be of no manner of consequence when contrasted with the real utility of the machine.

I have the honor to present a tourniquet upon a new plan: and, if it shall appear to be adapted to answer any good purpose to mankind, that consideration alone will be a sufficient reward.

It cannot be understood, that by here painting the scene of action in such black and dismal colours, I mean to deter and dishearten the young surgeon. I have been only reasoning upon what has happened, and what may be expected to happen again, with a view we may acquire the means to be always prepared for the worst: and, as the lives of so many brave and useful men, are entrusted to the care of one person, it is reasonable to think he should be amply furnished with every auxiliary, tending to the welfare of the whole.

After a general action between two fleets, it will happen, that some ships shall have more men wounded than others. In that case, if weather permitted, a signal might be established, that surgeons might mutually assist each other, according to the situation of their respective ships, relative to the number wounded.



